

# Nuclear Policy Challenges for 2025

## – New developments surrounding the use of nuclear power –

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# Key points of this report

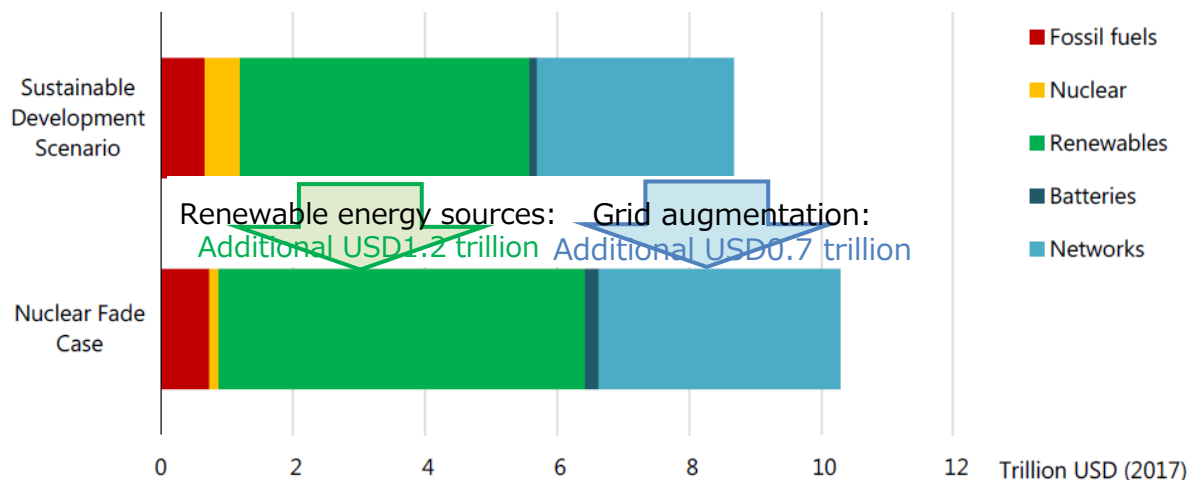
- ✓ In recent years, several analyses have been published that highlight the potential role of nuclear power from the perspective of climate change countermeasures and energy security. Furthermore, expectations of nuclear power are also growing due to the need to meet increased electricity demand as a result of the current expansion of data centers, etc.
- ✓ Despite significant delays, the planned construction of new reactors in the United States and France has mostly reached completion. Attention has focused on how the lessons learned from these experiences will be used in future projects.
- ✓ There are also new moves afoot in the United States to restart closed nuclear reactors, and for IT companies to utilize reactors.
- ✓ In Japan, the role of nuclear power is being further emphasized in Japan's draft Strategic Energy Plan. This plan forecasts that nuclear power generation will grow by about 20% from the FY2030 target, looking toward FY2040.
- ✓ Progress has also been seen in relation to restarting operations and the backend, yet many challenges remain as before, and continued discussions from 2025 will be essential.

# Developments surrounding nuclear power in recent years

- It has increasingly been pointed out in recent years that nuclear power is a valuable power source from the perspectives of climate change countermeasures and energy security.
  - It can also help respond to recent energy demands from generative AI and data centers.
- Analyses have been published by several countries and agencies that highlight the potential role of nuclear power in the transition from fossil fuels. (The following figure is a typical example.)

IEA comparison showing how required investment costs change when the “nuclear fade case” (failing to build new nuclear power) is applied (cumulative figures for 2019~2040)

These bars show how the investment required for the IEA’s Sustainable Development Scenario would grow if the assumptions set out on the right were applied

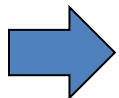


## Assumptions of the “nuclear fade case”

It assumes that in developed countries:

- No new nuclear reactors are constructed other than those whose construction is already underway
- No operational periods of existing reactors are to be extended apart from those extensions already approved at present
- No new investment is to be carried out in any existing nuclear power plants

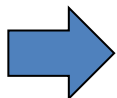
Source: IEA, *Nuclear Power in a Clean Energy System*, 2019. (Contains certain additions)



- This suggests that shifting away from fossil fuels without nuclear power would mean that large-scale additional investment would be required, including grid-level costs

## Trends in large-scale light water reactors in Europe and the United States

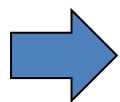
- Despite considerable delays, new construction projects in the United States, France, and Finland reached completion between 2023 and 2024.
- The United States is now exporting light water reactors to Bulgaria, Ukraine, and Poland.
  - Ukraine: 2 new reactors are being added to existing sites, while candidate sites for 4 new reactors have also been identified.
  - Poland: Applications for construction preparations have been sent to governors of the target regions.
  - Bulgaria: An engineering agreement has been concluded with Westinghouse Nuclear.
- France plans the construction of optimized version of European Pressurized Water Reactors (EPR2) at 3 sites (which already house existing reactors).
- In the Czech Republic, a South Korean company (KHNP) won the right of first refusal in negotiations for bidding on plant expansion.



- It will be important for U.S. and French manufacturers to learn from the causes of the delays and apply them to subsequent projects.
- The impact of political trends also merits attention.
  - President Trump has announced the updating of the Atomic Energy Commission, the continuation of existing reactors, and investment in new reactor models in his Agenda 47.
  - In France, a left-wing coalition is now the major political force. This could slow down President Macron's nuclear power policies.
  - Political turmoil in South Korea could also impact its nuclear power policies.

# Notable trends from 2025 onwards (World)

- A move to restart closed reactors in the United States has been gaining ground.
  - In October 2023, the Palisades Nuclear Plant applied for permission to restart operations.
  - Three Mile Island Unit 1 (TMI-1) will also restart operations and supply power to Microsoft.
  - The Duane Arnold Energy Center is also cited for restarting operations.



- There are new developments aimed at promoting more efficient utilization of existing U.S. reactors.
  - These have been boosted by support provided under the Inflation Reduction Act (IRA).
- However, it seems unlikely that many successor projects will take place after this.
  - Restarting operations at the reactors set out below which were closed in relatively recent years is expected to be challenging, as demolition work is already underway.

Reference: existing U.S. reactors already closed in recent years

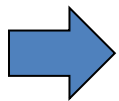
Date of closure	Name	Installed capacity	Location (state)	Main reason for closure
2018.9.17	Oyster Creek	652MW	New Jersey	Increased cost of environmental protection measures
2019.5.31	Pilgrim	711MW	Massachusetts	Declining profitability
2020.4.30	Indian Point 2	1,067MW	New York	Opposition of the state governor Declining profitability
2021.4.28	Indian Point 3	1,085MW		

Source: Created based on "Power Reactor Information System (PRIS)" from the IAEA

# Notable trends from 2025 onwards (World)

## New developments in the United States

- Moves by IT companies in the United States to utilize nuclear power have emerged. In addition to the previously cited TMI-1:
  - A data center directly connected with Susquehanna Steam Electric Station has been bought up by Amazon Web Services from Talen Electric.  
→ This relates to the issue of using plants for for “co-located load,” where a user takes its supply directly from the source rather than through a grid.
  - Google and Amazon are cooperating individually with firms developing Generation IV reactors.
- The Federal Energy Regulatory Commission (FERC) rejected a request to expand the supply from the Susquehanna plant (300 MW→480 MW) to AWS in November 2024.
  - The fact that the firm could avoid paying grid service-related costs and other factors were seen as problems in terms of fairness.



- There is a growing move among IT companies (users of energy) to utilize nuclear power.
  - Not only IT companies but chemical manufacturers, iron/steel manufacturers and other energy users in Europe and the United States are interested in introducing new models of reactors.
- On the other hand, this has also led to the emergence of the new issue of “co-located load.”
  - Advantages of co-located load include the shrinking of grid connection times, improved power transmission efficiency, and more spare capacity in the grid.
  - Japan, which is also pushing forward green transformation-centered siting of industry, should also pay attention to how this discussion develops, including discussion of how co-located loading should work.

# Notable trends from 2025 onwards (World)

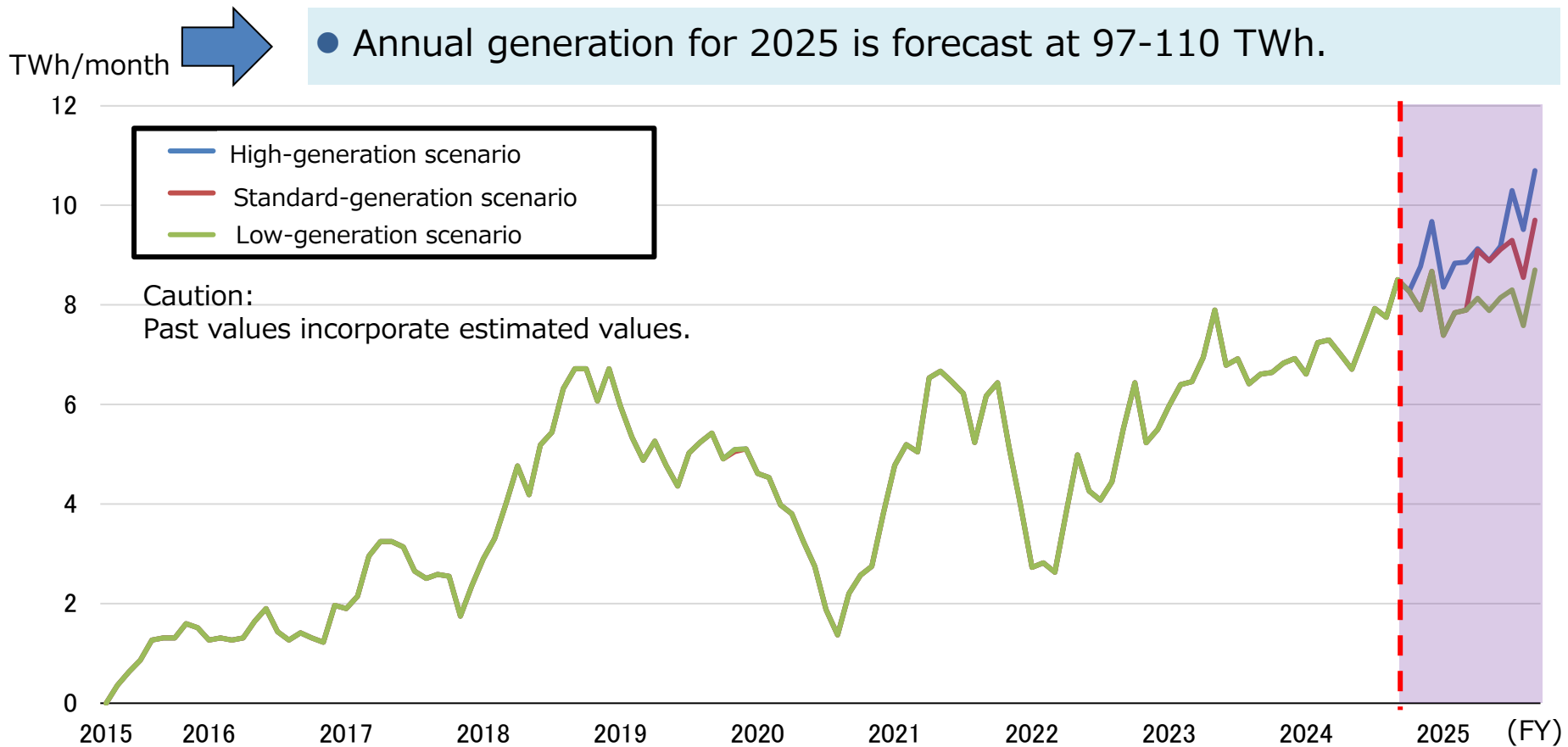
## Other major global trends (2024)

- Russia has continued its export projects. China has approved the construction of new facilities within its borders.

Country name	Main trend
United States	<ul style="list-style-type: none"><li>• Ban on importing Russian-produced low enriched uranium came into effect (exceptions are provided until the end of 2027)</li><li>• TerraPower and Kairos Power have begun work to enable the construction of new reactor models</li></ul>
UK	<ul style="list-style-type: none"><li>• Rolls-Royce was selected as the top supplier for an SMR project in the Czech Republic</li></ul>
Finland	<ul style="list-style-type: none"><li>• Trial operations of a geological repository for spent fuel were started</li></ul>
Sweden	<ul style="list-style-type: none"><li>• Environmental licenses were obtained for a geological repository for spent fuel and other facilities</li></ul>
Russia	<ul style="list-style-type: none"><li>• Construction began on Leningrad II-3 (Unit 7) in March 2024</li></ul>
China	<ul style="list-style-type: none"><li>• Work commenced on the Ningde-5, Shidaowan-1, etc.</li><li>• Construction of 11 new reactors at 5 locations was approved in August 2024</li></ul>
South Korea	<ul style="list-style-type: none"><li>• The groundbreaking ceremony was carried out for Shin Hanul 3 and 4 on October 2024</li></ul>
India	<ul style="list-style-type: none"><li>• A meeting in July 2024 between the Russian and Indian leaders on new construction in India by Russia and expansion to third countries etc.</li></ul>
UAE	<ul style="list-style-type: none"><li>• Commercial operation of the Barakah Nuclear Energy Plant Unit 4 (South Korea-built) began in September 2024</li></ul>
Egypt	<ul style="list-style-type: none"><li>• Work began on El Dabaa Unit 4 (Russian-built) in January 2024</li></ul>

# Short-term outlook for Japan

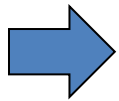
- Here, we have created Japan's 2025 domestic nuclear power generation forecast based on previously released operational plans and current trends of restarting reactors (the standard-generation scenario).
- High-generation scenario: If operations are restarted earlier than in the standard-generation scenario, followed by restarting of 1 additional reactor
- Low-generation scenario: If new restarting of operations does not take place within this period





## Discussion about the Strategic Energy Plan

- In discussions within the Strategic Policy Committee, many opinions were raised concerning energy security and the possibility of increased electricity demand.
- These discussions particularly focused on the following aspects of nuclear power:
  - Clarifying policy direction, including rebuilding reactors
  - Ensuring a predictable environment for business (creating the right business environment)
  - Encouraging greater understanding about hosting nuclear power plants (related to the green transformation-centred siting of industry) and the advantages of this for surrounding areas

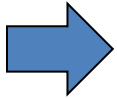


- In the draft version publicized in December 2024, a policy of stressing the role of nuclear was clearly evident.
  - A forecast that nuclear power generation would rise 20% from the 2030 target was set out.
  - Attention is set to focus on what direction is taken going forward in terms of specific policy measures.
- There is also discussion over whether energy users can be induced to invest in nuclear power.
  - In Europe and the U.S., energy users including IT firms and the industrial sector have developed an interest in nuclear power.
  - These kinds of activities among users will be crucial if reactors oriented to commercial use are actually to be introduced.

# Notable trends from 2025 onwards (Japan)

## Trends in restarting reactors

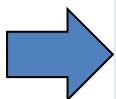
- The restarting of boiling water reactor (BWR) operations (Onagawa-2, Shimane-2) made progress in 2024.
- Reviews of the Tomari Nuclear Power Plant, including envisaging possible natural disasters, have also made progress.
- On the other hand, the Nuclear Regulation Authority decided not to approve the permit for Tsuruga-2, citing the failure by its operators to explain that there are no concerns about active faults. Japan Atomic Power Company is currently discussing its response to this.



- While permission has been obtained for the modification of 3 reactors' installations, applications for modifications for a further 9 reactors' installations are still at the review stage.
- Efficient progress with the reviews will become still more important going forward.

## Trends related to the backend

- In May 2024, Genkai Town in Saga Prefecture announced that it would accept the first stage (preliminary investigation) of the selection process for a geological repository for the high-level radioactive waste.
- In November, Suttsu Town and Kamoenai Village of Hokkaido proceeded as candidates to the second stage (outline survey).
- The planned completion date for the reprocessing facility in Rokkasho Village, Aomori Prefecture, has been further postponed.
- The interim storage facility for spent fuel in Mutsu City, Aomori Prefecture, commenced operation in November 2024.



- Attention is set to focus on the decisions made by Hokkaido and the two local governments concerning the outline review.
- It is crucial that these discussions expand to involve more local communities.
- It is expected that work will proceed towards completion of the reprocessing facility.